

Improving the City's Construction Project Closeout Process

January 18, 2005

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City of Seattle

Office of City Auditor

Susan Cohen, City Auditor

January 18, 2005

The Honorable Greg Nickels
Seattle City Councilmembers
City of Seattle
Seattle, Washington 98104

Dear Mayor Nickels and City Councilmembers:

Attached is our report on *Improving the City's Construction Project Closeout Process*. The primary objectives of the review were to determine whether Seattle Public Utilities' Construction Management section has adequate policies and procedures for construction closeout and whether staff complied with closeout procedures. The report also addresses some responsibilities held by other departments during the construction closeout process for projects managed by Seattle Public Utilities. These other departments include the Department of Executive Administration, the Seattle Department of Transportation, and Seattle City Light. Representatives of all the departments mentioned in this report formed a committee to develop a response to the report, which is included as Appendix 2.

We appreciate the assistance and professionalism of all the staff who participated in this review. If you have any questions, please call me at 233-1093.

Sincerely,

Susan Cohen
City Auditor

SC:md

Attachment

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Introduction and Results in Brief

The Office of City Auditor conducted a review of construction project closeout processes managed under Seattle Public Utilities' Engineering Services Branch. Construction closeout is an important part of the City's capital development process because it ensures fulfillment of contractual and legal obligations before releasing final payment to the contractor, and it facilitates commissioning the built infrastructure. Engineering Services' Construction Management Division manages construction contracts for the "client" departments of Seattle City Light, Seattle Public Utilities, and the Seattle Department of Transportation. The Construction Management Division also works with project managers from client departments and with the Contracting Services Division¹ of the Department of Executive Administration to close out construction projects.

The purpose of the review was to determine whether responsible departments have established adequate policies and procedures for construction closeout, and whether staff who perform Engineering Services' construction management functions complied with closeout procedures. Based upon our analysis of current construction management policies and procedures and our observations of closeout procedures applied to several construction projects, we determined that:

1. Construction Management, Contracting Services, and project management units at Seattle City Light's Generation Branch and at Seattle Public Utilities have established generally effective construction closeout procedures;
2. Project management divisions at Seattle City Light's Finance and Administration Branch Facilities Division and Distribution Branch, and at the Seattle Department of Transportation, have not established formal closeout policies and procedures;
3. Client departments could benefit from a project hand-off that includes training opportunities, particularly for projects utilizing new or unfamiliar technology;
4. The City could potentially save money by routinely inspecting built infrastructure before construction warranties expire;
5. Construction and project managers could improve contract administration by routinely conducting post-project evaluations and sharing outcomes of the evaluations with other staff; and
6. Construction Management, Contracting Services, and project management divisions generally complied with closeout procedures.

Background

In 1996, the City consolidated construction management functions for Seattle City Light, the Seattle Department of Transportation, and Seattle Public Utilities under the Construction Management Division of Seattle Public Utilities' Engineering Services Branch. As a result of the reorganization, the Construction Management Division now manages nearly half of the City's construction contracts, which accounted for \$27.7 million (43 percent) of the \$63.9 million in construction projects closed out in 2003. Management of the City's other construction contracts is decentralized and assigned to the department responsible for operating the built infrastructure.

¹ Contracting Services, which falls under the Department of Executive Administration, establishes the rules governing the selection of consultants, manages the public bidding process and monitors contracts for compliance with public works regulation.

Engineering Services’ construction management process involves the Construction Management Division, the Department of Executive Administration’s Contracting Services Division, and client department project management and service center divisions. Exhibit 1 below shows each division’s primary responsibilities and involvement with the capital project construction process.

Exhibit 1: Construction Management, Contracting Services, and Project Management Roles in the Capital Project Construction Process		
<i>Department/Division</i>	<i>Major Responsibilities</i>	<i>Project Phase(s)</i>
Seattle Public Utilities Engineering Services Branch Construction Management Division	Oversee contractor’s work and document construction activities for contractor compliance, quality control, billing and funding purposes	Construction
Department of Executive Administration Contracting Services Division	Establish rules for consultant selection, manage bidding process, and monitor compliance with public works regulation and legal claims	Design and Construction
Project Managers and Project Engineers for Client Departments	Oversee project budget, public relations, permitting issues, and project commissioning	Planning, Design, and Construction
Sources: Engineering Services’ <i>Construction Management Manual</i> and <i>Project Management Guide</i> , City Light’s <i>Generation Branch Operations/Project Core Team/Lead Project Engineer Roles and Responsibilities Project Checklist</i> , and Contracting Services’ <i>Contract Payment Procedures</i> .		

As shown above, Construction Management is primarily involved with the capital project development process during the construction phase, and oversees the physical construction work. Contracting Services is responsible for establishing rules for consultant selection (affecting the design phase), and for monitoring public works compliance and legal issues during the construction phase (including contract bidding). Project managers are assigned to projects from planning through construction, and manage associated budgets, public relations issues, commissioning, and other administrative tasks. Seattle Public Utilities’ project managers come from various lines of business within the utility, including Drainage, Wastewater, Water, and Solid Waste. Seattle City Light has construction project managers in three branches: Finance and Administration Branch, Generation, and Distribution. The Seattle Department of Transportation has a single division to manage the development of capital projects.

Construction closeout formally wraps up the construction phase of the capital development process and controls for some of the risks associated with building public works projects. The City mitigates the risk that a contractor would fail to pay workers, subcontractors or tax obligations by withholding retainage (5 percent of all contract payments) until any such claims have been paid and compliance with public works requirements has been established. The City also requires contractors to post payment and performance bonds in the amount of the contract award, and produce proof of insurance that is acceptable to the City and commensurate with the type of work being performed. In addition, all construction contracts contain indemnification and hold harmless provisions to ensure that the City is held harmless from the acts and omission of the contractors, and that we are provided defense if claims or law suits are pursued against us.

Additional risks such as not fully completing final project details, encountering complications arising from project commissioning, or having inadequate or incomplete records of what has been built or changed, are managed by the construction closeout portion of Engineering Services' construction management process.

Methodology

The Office of City Auditor conducted the review of the construction project closeout process between January and August 2004, in accordance with the standards for the professional practice of internal auditing. Our research methodologies included:

- Interviewing staff and management from Engineering Services, Contracting Services, and client departments to identify program objectives, work-flow processes, and accounting procedures;
- Reviewing written policies, procedures, and other documentation associated with the construction contract closeout process;
- Researching legal and regulatory requirements for public works projects in the City of Seattle and Washington State, and identifying current issues and trends in construction contract litigation;
- Identifying industry standards and best practices for closeout of public works construction projects, and comparing the Engineering Services construction management closeout procedures to best practices; and
- Completing a case study of a Seattle Public Utilities drainage project to identify construction management and closeout issues, and testing a sample of completed projects to determine whether staff adhered to closeout procedures.

Findings and Recommendations

Finding 1: Seattle Public Utilities, the Contracting Services Division in the Department of Executive Administration and Seattle City Light's Generation Branch Have Established Sound Policies and Procedures for Closing Out Construction Projects.

We concluded that the Construction Management Division of Seattle Public Utilities, the Contracting Services Division in the Department of Executive Administration, and Seattle City Light's Generation Branch have established effective closeout processes based upon their written procedures, which included most of the activities that we determined to be essential for closeout. Appendix 1 of this report lists critical closeout activities, shows whether departments included them in their written procedures, and describes the criteria we used for including the activities in our analysis.

However, we identified some opportunities for Seattle Public Utilities' Engineering Services Branch to improve its closeout practices. Finding 3 of this report discusses providing training to field operations groups (noted as an essential closeout activity missing from closeout procedures in Appendix 1). Findings 4 and 5 discuss managing contract warranties and conducting routine

post-project evaluation meetings to further mitigate closeout risks.

Finding 2: Project Management Divisions at the Seattle Department of Transportation and at Seattle City Light's Finance and Administration Branch Facilities Division and its Distribution Branch Have Not Established Formal Procedures for Closing Out Construction Projects.

The Department of Transportation has not updated its *Project Management Manual* since 1986, and City Light's Finance and Administration Branch Facilities Division and its Distribution Branch have not issued written manuals for project management of construction projects. However, as we did no testing of project management practices as part of this audit, we could not determine whether these departments apply effective closeout practices.

Construction management best practices recommend that developers establish and document closeout policies and procedures. The Office of Federal Procurement Policy urges developers of federal infrastructure to create a closeout checklist that explicitly communicates closeout activities required of staff. Some public works developers also use procedure manuals to clarify which staff members are responsible for completing each activity. This job allocation reduces the likelihood that staff will duplicate each other's work or overlook critical tasks. Providing policies and procedures manuals can also ensure that staff complete tasks consistently across a department and over time.

It is noteworthy that the Seattle Department of Transportation has begun updating its project manager procedure manual. The Seattle Department of Transportation project manager lead indicated that the Capital Projects and Roadway Structures Unit is revising the 1986 *Project Management Manual*, and will issue updated procedures to its staff by the summer of 2005.

Recommendation #1: *The Seattle Department of Transportation should write and distribute formal policies and procedures for managing the capital development process and project closeout, and Seattle City Light's Finance and Administration Branch Facilities Division and its Distribution Branch should write and distribute formal policies and procedures for managing construction contracts closeout. Closeout procedures should incorporate essential tasks not performed by Construction Management or Contracting Services. Closeout procedures should clearly designate the staff responsible for each task, and should encompass project hand-off and post-construction evaluation issues discussed below in Findings 3, 4, and 5.*

Finding 3: Client Departments Could Benefit From Project Hand-off That Includes Training Opportunities, Particularly for Projects with New or Unfamiliar Technology.

Based upon our interviews with staff, and comparison of current policies and procedures to industry practices, we determined that Engineering Services' construction management model could better serve client departments by including a provision regarding training opportunities for operating and maintaining completed infrastructure. Due to the fact that the essential components of electrical, drainage, waste disposal, and transportation infrastructure do not change much over time or from project to project, clients would particularly benefit from training for projects that employ new or unfamiliar technology.

Engineering Services' current construction management manual does not include a provision regarding training for clients, even though other public works developers consider it to be an

important element of closing out a construction project (see Appendix 1). Most of the time, clients' field operations groups do not need training because staff have the necessary expertise to operate infrastructure, or can rely on operation and maintenance manuals made available by project managers.² Techniques for operating or maintaining public works infrastructure do not vary much over time or across projects, and so clients can also apply past experiences to operations issues.

However, clients have few resources to call upon when new technologies are introduced to physical infrastructure. Seattle Public Utilities' Drainage and Wastewater Division is currently grappling with maintaining new "natural" drainage systems³ employed in some drainage infrastructure. The Supervising Civil Engineer Specialist at the Drainage and Wastewater Strategic Operations Group indicated that maintenance staff have expertise in traditional drainage technologies, but have received minimal training for maintaining natural drainage infrastructure. Formal training would assist Drainage and Wastewater with physically maintaining the infrastructure, and would also provide "big picture" perspectives that could be incorporated into program budgeting and other organizational decisions. Managing natural drainage technologies will become an increasing issue as the City continues to call for this infrastructure in comprehensive drainage plans.⁴

Recommendation #2: *Engineering Services should arrange for staff at the Drainage and Wastewater Division to receive training on maintaining natural drainage technologies. In future projects, project managers and project engineers should act as a liaison between client departments and Engineering Services to ascertain whether training is required and, if so, to arrange training between the client department and Engineering Services, or outside contractors.*

Finding 4: The City Could Potentially Save Money by Routinely Inspecting Built Infrastructure Prior to Expiration of Construction Warranties.

Client departments may redress defects in construction workmanship by submitting a claim under contract warranty or by filing a lawsuit against the contractor. City construction contracts contain a warranty clause that obligates the contractor to respond to all claims of workmanship defects filed within a year of the physical completion date. Additionally, the Revised Code of Washington, Sections 4.16.300 and 4.16.310, grants developers the right to sue construction contractors to repair defects within six years of substantial completion (the date that the project was declared physically usable). If a defect or deficiency can be identified during the contract warranty period, the City would benefit more by filing a claim under the contract warranty rather than by initiating a lawsuit due to the costs, repair delays, and animosity caused by litigation. However, the warranty period is usually only one year from project completion, which may not be sufficient time for all defects to be detected. This presents a challenge to departments to

² We were only able to confirm that Seattle Public Utilities and the Seattle City Light Generation Branch project management units have established procedures for creating operations and maintenance manuals.

³ Natural drainage systems use environment-friendly, passive features (i.e., thickened road edges) and natural filtration systems (i.e., gravel and vegetation) to drain water. In contrast, traditional technologies utilize pipes, gutters, and other fixed drainage infrastructure. Natural systems are more prone to erosion and require more maintenance over time than traditional approaches.

⁴ Resolution 30642 provides the framework, and Ordinance 121459 provides the funding to incorporate natural drainage systems into the Northgate and Pinehurst neighborhood comprehensive plans.

ensure all work is carefully inspected.

However, the City may be underutilizing contract warranties because, according to the Principal Construction Engineer at Engineering Services, the City does not regularly inspect completed infrastructure to identify defects before the warranty expires. Rather than hold routine warranty inspections, client departments' field operations groups respond to problems reported by field crews or by the public, or inspect some projects in long-term intervals. Once a contractor has completed construction work and received final payments, the client assumes full responsibility for maintaining the project, and identifying any deficiencies or defects that would be covered by contractors' warranties.

Recommendation #3: *Field operations units at Seattle Public Utilities, Seattle City Light, and the Seattle Department of Transportation should conduct inspections of completed construction projects at least 90 days before the warranty expires in case they need to file a claim. Project managers or project engineers with knowledge of the technical aspects of the infrastructure should be present at the inspection to assist in identifying problems that may have been identified during construction.*

Finding 5: Construction and Project Managers Could Continually Improve Contract and Project Administration by Regularly Conducting Post-Project Evaluations and Sharing Outcomes with Staff Who Support Construction Management Functions.

Public works construction projects often do not go as planned for a variety of reasons, which may result in cost overruns, delays, litigation, and bad publicity for the developer. Many developers capitalize on the opportunity to learn from past challenges by conducting a post-project evaluation to identify approaches for similar challenges in future projects. A single staff person may complete post-project evaluations, or the evaluation may include input from the construction management team, the general contractor, and other involved parties in a "lessons-learned" meeting.

In April 2004, Seattle Public Utilities released the *Seattle Public Utilities CIP Project Cost Analysis Final Report*, which recommended that construction management teams hold regular post-construction reviews of capital projects. The report was the result of a yearlong cost analysis and benchmarking study conducted by Seattle Public Utilities' ad hoc CIP Cost Analysis Committee and the consulting firm CH2M Hill. One of the report's 15 recommendations was that construction management staff should regularly evaluate projects during closeout and create a feedback mechanism to share outcomes with other staff. The report's authors identified the recommendation as high priority in terms of its potential to reduce overall construction costs.

The post-project evaluation is incorporated into Engineering Services' construction management model in the form of a lessons-learned meeting. The Engineering Services Division's construction management model currently designates the lessons-learned meeting as a project manager (client) responsibility, since the project manager is the single point of contact throughout the development process. Seattle Public Utilities and Seattle City Light Generation Branch project management divisions include lessons-learned meetings in their closeout procedures. Project management divisions in Seattle City Light's Distribution Branch and Finance and Administration Branch Facilities Division and the Seattle Department of

Transportation do not have formal closeout procedures, but project manager leads from those divisions recognized lessons-learned meetings as a prudent construction management practice.

However, based upon our testing of a sample of 39 construction projects managed by Engineering Services' Construction Management Division and closed out between March 2003 and April 2004, we concluded that project managers do not regularly conduct lessons learned meetings during closeout. Project managers conducted lessons-learned meetings for only seven of 39 projects we reviewed, or 18 percent. Six of these were Seattle Public Utility projects and one was a Seattle Department of Transportation project.⁵

Additionally, staff who do hold lessons-learned meetings do not routinely share "lessons" with other construction and project management staff. Consequently, valuable information about ways to improve future projects is limited to the people attending the lessons-learned meeting. For example, we completed a case study of a Northwest 90th Street and 12th Avenue Northwest drainage project, for which the project manager held a lessons-learned meeting. Staff who attended the meeting attributed part of the nearly \$100,000 in construction cost overruns to the fact that the Seattle Department of Transportation's Roadway and Standards Group did not approve the project specifications early on in the design process. The construction management team recommended that future working agreements with the Seattle Department of Transportation clarify design review requirements. However, because the lessons from this project's evaluation meeting were not shared, outside staff could not use this information in their future projects.

The current construction management model, which assigns the lessons-learned duty to the project manager, may not be the best way to ensure that lessons-learned meetings are held. Project managers oversee a caseload of capital projects, and are ultimately removed from the physical construction work of the contract. On the other hand, Construction Management's staff engineers are usually assigned to a single project, have more control over the construction process than project managers, and therefore may be in a better position to initiate scheduling of the meeting. In either case, it is important that the meeting is held and that lessons are shared. Since discussing problems that occurred with a project can result in attempting to assign blame in an unproductive way, it may be useful to have a skilled facilitator conduct such meetings. This will enable an understanding of the lessons without unnecessary hard feelings among the participants.

Recommendation #4: *Construction management teams should regularly evaluate projects during closeout. In the interest of facilitating regular lessons-learned meetings as an efficient use of staff time, the Engineering Services construction management model should either:*

- a) *Take steps to ensure that Project Managers fulfill their assigned responsibility to hold a lessons learned meeting for each project; or*
- b) *Assign a person skilled in facilitation to ensure the meetings are scheduled and conduct the meetings; and/or*
- c) *Create a quarterly lessons learned meeting during which project and construction managers on multiple projects discuss past project challenges and possible future*

⁵ Of the seven projects that had lessons-learned meetings, we were only able to locate lessons-learned documentation for four of the projects, all of which were managed by Seattle Public Utilities project managers.

- solutions; and/or
- d) Define specific criteria for holding a lessons learned meeting (i.e., a dollar threshold for cost overruns), and require staff to hold lessons learned meetings for all projects that meet those criteria; and/or
 - e) Shift responsibility for holding the lessons learned meeting from the project manager to the engineer primarily responsible for overseeing the project.

Recommendation #5: *The Engineering Services construction management model should include a formal venue for construction and project management staff to share lessons learned with their colleagues. Construction and project management staff could share lessons by creating an agenda item for regular staff meetings, sending out quarterly e-mails featuring post-project evaluation meeting outcomes, or posting lessons learned to an internal Web page so that staff can refer to them for future projects.*

Finding 6: Construction Management, Contracting Services, and Project Management Divisions with Closeout Policies and Procedures Generally Adhered to Established Procedures.

Based upon our review of project documents, and interviewing staff and clients associated with Engineering Services' construction management model, we determined that departments with formal closeout procedures generally complied with closeout procedures. We were unable to determine whether project management divisions at the Seattle Department of Transportation or Seattle City Light Finance and Administration Branch Facilities Division or its Distribution Branch complied with closeout best practices since they have not established formal procedures and we did not test their practices as part of this audit.

We reviewed project documents for the Northwest 90th Street and 12th Avenue Northwest project case study and found that Construction Management, Contracting Services, and the Seattle Public Utilities project manager assigned to the project completed most closeout procedures established by each department. The exception to this was that the project manager did not fill out a preliminary closeout form, which is used for calculating depreciation for accounting purposes. However, since the project manager filled out a final closeout form and submitted it to the appropriate accounting unit six months later, we considered this oversight to be immaterial.

We also reviewed documents from 14 projects managed by Engineering Services' Construction Management Division to determine whether staff completed activities associated with closing out the physical construction portion of the contract. The sample of 14 construction projects included contracts from each operations unit at all three client departments. We found that the project engineer for each of the 14 projects completed all closeout activities that we considered to be most critical, including: a) declaring a project substantially complete; b) holding a final inspection; c) issuing a punch list and verifying punch list item completion; d) declaring physical completion; e) calculating damages owed by the contractor (if any); and f) evaluating the contractor.

Finally, we learned from our interviews with the client departments' staff and Engineering Services' staff that project managers generally adhere to established closeout procedures. The exception to this is that, as we discussed in Finding 5, project managers do not regularly hold post-project evaluation meetings. We did not complete systematic testing of project manager closeout duties because supporting documentation and information systems were decentralized

and difficult to access.

Appendix 1: Essential Closeout Activities

Exhibit 1 below shows closeout activities that we identified as essential, the objective of the closeout activity, and whether the Engineering Services construction management model incorporates the activity into closeout procedures. We compiled the list of activities by reviewing the closeout policies of four other public works developers: the University of Washington; the City of Austin, Texas; the State of Texas; and the Massachusetts Port Authority. We determined closeout activities to be essential if they appeared in the closeout procedures of at least two of the four public works developers, or if they were required by Washington State law.

Exhibit 1: Essential Closeout Activities Included in Seattle Public Utilities Engineering Services Construction Management Model		
Closeout Activity	Objective	In Closeout Procedures?
Issue a <i>Notice of Substantial Completion</i> , and schedule a final inspection.	Designate the project as legally usable; communicate that work will be inspected.	X
Hold final inspection and issue a “punch list” of outstanding contract work for the contractor.	Verify completion of work and construction quality; communicate additional work requirements to the contractor.	X
Verify completion of punch list work and issue a <i>Notice of Final Completion</i> .	Confirm and document that the contractor completed outstanding work.	X
Conduct an evaluation of the general contractor.	Document the general contractor’s work performance for future reference.	X
Calculate damages and other deductions, and adjust final payment accordingly.	Adjust the contract to compensate for damages caused by the contractor.	X
Obtain construction warranties.	Take advantage of contractor warranties on project defects.	X
Create or obtain operation and maintenance manuals. *	Provide documentation to clients for operating and maintaining the project.	X
Obtain and file as-builts final drawings. *	Record technical characteristics of completed infrastructure.	X
Resolve environmental and property permitting issues. *	Comply with environmental regulations and land use code.	X
Conduct post-project evaluation. *	Identify ways to improve construction management in future projects.	X
Provide training to end user of project. **	Enable end user to correctly operate and maintain built infrastructure.	
Obtain releases from the Washington State Department of Revenue, Employment Security, Labor and Industries; and City Revenue and Consumer Affairs.	Comply with public works regulation.	X
Resolve outstanding legal claims.	Protect the City from counter claims.	X
Collect the contractor’s final payroll data.	Comply with public works regulation.	X
Sources: Construction management policy and procedure manuals for Engineering Services and supporting departments, University of Washington, and the Massachusetts’s Port Authority, and construction audits for the City of Austin and the State of Texas. *We were only able to verify that Seattle Public Utilities project management divisions established closeout procedures for these project manager activities. **City Light’s Generation Branch capital project procedures development checklist includes arranging training for client departments. Seattle Public Utilities Engineering Services’ construction management model does not include a procedure for ensuring that client departments receive training.		

Appendix 2: Executive Response

**Comments from Seattle City Light, Seattle Public Utilities,
Seattle Department of Transportation, and Department of Executive Administration
On the Draft *Review of Construction Project Closeout Processes*
Managed Under Seattle Public Utilities' Engineering Services Branch
Prepared by the Office of City Auditor**

This document represents the consolidation of comments from Seattle City Light (SCL), Seattle Public Utilities (SPU), Seattle Department of Transportation (SDOT), and the Contracting Services Division of the Department of Executive Administration (DEA) (Departments) on the draft *Review of Construction Project Closeout Processes Managed Under Seattle Public Utilities' Engineering Services Branch* prepared by The Office of City Auditor (Construction Closeout Audit Report).

On behalf of all contributing Departments, we appreciate the opportunity to review this draft report and provide comments prior to it being finalized. We also appreciate the thorough review of our closeout processes, and the specific recommendations that we believe will result in process improvements and consistency across our Departments.

We are pleased that your research determined that SPU, DEA, and SCL's Generation Branch have established sound policies and procedures for closing out construction projects, and that these policies and procedures included most of the critical closeout activities. In addition, we are pleased that the City Auditor recognized that Construction Management, Contracting Services, and the project management divisions generally complied with established closeout policies and procedures. As a reference tool, Appendix 1 Exhibit 1 from the Audit Report has been amended as Exhibit 1 of this document to show the City department(s) and/or division(s) with the primary responsibility for each of the closeout activities listed.

Our comments are in three forms:

1. This document contains how the Departments' propose to address the recommendations contained in the Construction Closeout Audit Report.
2. Comments from the contributing Departments that are specific to their organizations are provided as attachments to this document (individual Department comments from SDOT, and SCL's Generation and Distribution Branches, Attachments A, B and C, respectively).
3. Suggested modifications of the Construction Closeout Audit Report are shown in edit mode in the attached Word file.

The remainder of this document contains how the Departments plan to implement the recommendations contained in the report. To help ensure that these recommendations are addressed consistently across the Departments, a Construction Closeout Committee was assembled with representatives from all participating Departments that have responsibility for construction contract closeout activities.

Inter-Department Construction Contract Closeout Committee		
Chris Larsen	SCL	Distribution Branch
Rebecca Rufin	SCL	Generation Branch
Scott Hayes	SCL	Finance and Administration Branch
Stu Nelson	SDOT	Roadway Structures and CIP Project Management
Betty Meyer	SPU	Engineering Division

Glynda Steiner (Chair)	SPU	Construction Management Division
Linneth Riley-Hall/Liz Alzeer	DEA	Contracting Services Division

Recommendation #1: *The Seattle Department of Transportation and Seattle City Light’s Finance and Administration Branch Facilities Division and its Distribution Branch should write and distribute formal policies and procedures for managing the capital development process and project closeout. Closeout procedures should incorporate essential tasks not performed by Construction Management or Contracting Services, including filing as-built project drawings, creating operation and maintenance manuals, resolving environmental and property permitting issues, and formally handing off the project to field operations. Closeout procedures should clearly designate the staff responsible for each task, and should encompass project hand-off and post-construction evaluation issues discussed below in Findings 3, 4, and 5.*

Departments’ Response:

SPU Construction Management Division is responsible for maintaining as-built drawings during construction. For most projects, the “red-line” drawings are submitted monthly by the construction Resident Engineer. The monthly construction progress, both as-designed and as-built (if different from designed), is then recorded by SPU’s Engineering Support Division on dedicated layers of the projects’ CADD files. For some projects (usually buildings), the construction contractor or the architect maintains the as-built records and submits them at the close of the construction project.

SDOT has begun updating its project manager procedure manual and plans to issue updated procedures to its staff by the summer of 2005.

Does SCL Distribution and Finance and Administration Branches want to commit to developing policies and procedures for managing the capital projects contract closeout?

Recommendation #2: *Engineering Services should arrange for staff at the Drainage and Wastewater Division to receive training on maintaining natural drainage technologies. In future projects, project managers should act as a liaison between client departments and Engineering Services to ascertain whether training is required and, if so, to arrange training between the client department and Engineering Services, or outside contractors.*

Departments’ Response:

In general, we believe most CIP projects have adequately identified the need for training of the construction CIP asset and the contract documents have provided for training of the City’s operation and maintenance personnel (e.g., pump stations, Ballard Bridge mechanical retrofit). However, the Inter-Department Closeout Committee will review current practices, and recommend additional guidelines if necessary. Specifically, the Committee will identify the types of projects and the elements of those projects for which training is required to help ensure that the constructed assets are maintained properly. The Committee will prepare guidelines identifying the criteria that will be used to select projects that have training needs, the specific aspects, equipment, or facilities that require training for operation and/or maintenance, and options for providing that training. Input from the Departments’ operation and maintenance groups will also be obtained in identifying the appropriate actions to be taken.

Recommendation #3: *Field operations units at Seattle Public Utilities, Seattle City Light, and the Seattle Department of Transportation should conduct inspections of completed construction*

projects at least 90 days before the warranty expires in case they need to file a claim. Project managers or project engineers with knowledge of the technical aspects of the infrastructure should be present at the inspection to assist in identifying problems that may have been identified during construction.

Departments' Response:

The Inter-Department Closeout Committee will identify the types of projects and the elements of those projects for which warranty inspections may be required to help ensure that the assets have been constructed properly and are in good working order before the warranty period expires. It is expected that this initial determination will be made on a project by project basis at the beginning of construction. The Committee will prepare guidelines identifying the criteria that will be used to select projects that have potential warranty concerns, the specific aspects, equipment, or facilities that require warranty inspection, and whether it is SPU's Construction Management Division or the client's division that will be responsible for conducting the warranty inspections. Input from the Departments' operation and maintenance groups will also be obtained in identifying the appropriate actions to be taken.

Recommendation #4: *Construction management teams should regularly evaluate projects during closeout. In the interest of facilitating regular lessons-learned meetings as an efficient use of staff time, the Engineering Services construction management model should either:*

- f) Take steps to ensure that Project Managers fulfill their assigned responsibility to hold a lessons learned meeting for each project; or*
- g) Assign a person skilled in facilitation to ensure the meetings are scheduled and conduct the meetings; and/or*
- h) Create a quarterly lessons learned meeting during which project and construction managers on multiple projects discuss past project challenges and possible future solutions; and/or*
- i) Define specific criteria for holding a lessons learned meeting (i.e., a dollar threshold for cost overruns), and require staff to hold lessons learned meetings for all projects that meet those criteria; and/or*
- j) Shift responsibility for holding the lessons learned meeting from the project manager to the engineer primarily responsible for overseeing the project.*

Departments' Response:

The Inter-Department Closeout Committee will identify some general post-construction review guidelines that will be implemented at the completion of the construction projects that SPU administers. The committee will review the five alternatives presented above, and possibly others, before making a recommendation. However, it is likely that the type of post-construction review may be dependent on several factors, and we may recommend different alternatives for different types of projects. In addition, the Committee will identify a general list of topics and issues to be covered during the post-construction meeting, participants (e.g., project manager, design engineer, resident engineer, communication liaison, etc.), party responsible for calling/overseeing the meeting, documentation, methods for communicating lessons learned, steps to take corrective actions based on lessons learned, criteria for using third-party meeting facilitator, timing of the post-construction meeting, and other related items.

Recommendation #5: *The Engineering Services construction management model should include a formal venue for construction and project management staff to share lessons learned with their colleagues. Construction and project management staff could share lessons by creating an*

agenda item for regular staff meetings, sending out quarterly e-mails featuring post-project evaluation meeting outcomes, or posting lessons learned to an internal Web page so that staff can refer to them for future projects.

Departments' Response: This is addressed in the Departments' Response to Recommendation # 4.

Exhibit 1: Essential Closeout Activities Included in Seattle Public Utilities Engineering Services Construction Management Model			
Closeout Activity	Objective	In Closeout Procedures?	Responsible Department/Division
Issue a <i>Notice of Substantial Completion</i> , and schedule a final inspection.	Designate the project as legally usable; communicate that work will be inspected.	X	SPU/Construction Management Division
Hold final inspection and issue a "punch list" of outstanding contract work for the contractor.	Verify completion of work and construction quality; communicate additional work requirements to the contractor.	X	SPU/Construction Management Division
Verify completion of punch list work and issue a <i>Notice of Final Completion</i> .	Confirm and document that the contractor completed outstanding work.	X	SPU/Construction Management Division
Conduct an evaluation of the general contractor.	Document the general contractor's work performance for future reference.	X	SPU/Construction Management Division
Calculate damages and other deductions, and adjust final payment accordingly.	Adjust the contract to compensate for damages caused by the contractor.	X	SPU/Construction Management Division
Obtain construction warranties.	Take advantage of contractor warranties on project defects.	X	To be determined by Inter-Departmental Committee (see Recommendation #3)
Create or obtain operation and maintenance manuals.	Provide documentation to clients for operating and maintaining the project.	X	SPU/Construction Management Division to obtain O&M manuals for equipment and facilities specified in contract. Department PMs/Designers for others.
Obtain and file as-builts final drawings.	Record technical characteristics of completed infrastructure.	X	SPU/Construction Management Division and Engineering Support Division
Resolve environmental and property permitting issues.	Comply with environmental regulations and land use code.	X	Department PMs
Conduct post-project evaluation.	Identify ways to improve construction management in future projects.	X	To be determined by Inter-Departmental Committee (see Recommendations #4 and #5)
Provide training to end user of project.	Enable end user to correctly operate and maintain built infrastructure.		To be determined by Inter-Departmental Committee (see Recommendations #2)
Obtain releases from the Washington State Department of Revenue, Employment Security, Labor and Industries; and City Revenue and Consumer Affairs.	Comply with public works regulation.	X	Department of Executive Administration/Contract Services Division
Resolve outstanding legal claims.	Protect the City from counter claims.	X	SPU/Construction Management Division in conjunction with Client Department PMs
Collect the contractor's final	Comply with public works	X	Department of Executive

payroll data.	regulation.		Administration/Contract Services Division
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Attachment A – Comments from SDOT (comments from Stu Nelson)

Thank you for the opportunity to review this report on closeout procedures. We are pleased to see that your research found that all closeout activities considered to be critical were completed, and that project managers generally adhere to established closeout procedures.

We believe your recommendations will be helpful to us as we are currently updating our Project Management Manual (as you report points out).

As to specific recommendations we have the following comments:

1. SDOT has no formal closeout procedure. We intend to develop a formal procedure as part of the update of the Project Delivery Manual. Current status is we have delivered a draft close out procedure to the consultant who is preparing the PDM. The PDM will be completed in 2006 but we anticipate working drafts in mid 2005. Roles and responsibilities will be a part of the manual and will cover the overall Close out procedure.
2. Inspect the project prior to expiration of the warranty period. We will also incorporate this into the Project Delivery Manual - (the PM will let the relevant operations units know when the warranty is due to expire so they have time to review and submit warranty claims.)
3. Have Construction management provide training in the use of new infrastructure. We will revise our Construction MOA to make this a standard practice where new technology is involved.
4. Lessons learned meetings. We are working with SPU to formalize a revised process and will incorporate that into the construction MOA and the SDOT PDM.

Attachment B – Comments from SCL/Generation Branch (comments from Rebecca Rufin)

Based on the introduction, background, and methodology described in the audit, SCL assumes the audit is intended to address only a limited piece of the capital project process, i.e., construction contract close-out processes that are within the jurisdiction of SPU Construction Management. However, the findings and recommendations presented in the audit go well beyond that scope. In keeping with what we believe to be the limited intent of the audit, the SCL response is limited to construction closeout processes where there is SPU Construction Management involvement.

Throughout the document, the terms "construction contract closeout" and "construction project closeout" appear to be used interchangeably, and there is no distinction made between them. The same appears to be the case with "capital project" and "construction project". However, from a project management point of view these terms are not synonymous at all. A single capital project may consist of any number of purchase contracts, construction contracts, and design contracts, as well as in-house design and construction. As-built drawings are not limited to construction contracts. Training may be a part of a capital project without having any relation to a construction contract that is also part of the project.

There will be closeout activities associated with any contract established within a capital project, but these are just a subset of overall project closeout activities. Many of the recommendations made in the audit appear to pertain to overall project closeout, as opposed to construction contract closeout. The SCL Generation Branch process referred to in the report covers general project development and closeout procedures (which do include construction contracts).

The only involvement that SPU's Construction Management Division has with a client's capital project is with the development, execution, and administration of construction contracts, including construction contract closeout activities. Actual contract closeout requirements will vary significantly dependent on the contract scope, terms and conditions. On the other hand, capital project close-out is coordinated by a project manager/engineer within the client department, and encompasses all aspects of contract close-outs, training, as-built records, lessons-learned meetings, accounting close-out, and other closing documentation.

I feel it's important to keep the above clarifications in mind when interpreting the audit.

Attachment C – Comments from SCL/Distribution Branch (comments from Chris Larsen)

Our general comments regarding the recommendations are described below. We appreciate the opportunity to comment and participate in the process. Thank you for your consideration.

Note in the attachment: proposed additions are in red and deletions in blue - adobe is not the best program for making visible revisions so please excuse the less than perfect format.

Document page 2. We have added references to project engineers because in the Distribution Branch, projects are often managed by our service center engineers, as project manager resources are limited.

Recommendation 1. We agree with the general principle that construction contract closeout procedures should be documented and roles and task responsibilities should be clarified. Respectfully, we simplified the language to help focus on construction closeout and removed references that may not be applicable - for example SPU is largely responsible for contractor as-built oversight.

Recommendation 2. We generally agree with this training related recommendation.

Recommendation 3. We believe a good approach to addressing this recommendation is to work on an interdepartmental team to help determine circumstances and criteria when post project inspections are advisable. Resource requirements should also be addressed. We added clarifying language in the findings discussion as well.

Recommendation 4. We believe option e) in the recommendations is a practical approach and we'll work with SPU on all of the options.

Recommendation 5. We see great merit in lessons learned exercises that incorporate broad audiences and we will work with the interdepartmental team to further this practice.

Additional information: City Light's Distribution Branch actively participated in preparing the City - Sound Transit Project Management Manual, which included a project closeout chapter.

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